ABSTRACT

The present invention relates to a method for forming an isolation film for semiconductor devices. This method comprises the steps of: successively forming a first oxide film and a nitride film on a semiconductor substrate; patterning the nitride film and the first oxide film to expose a portion of the semiconductor substrate, which corresponds to an isolation region; implanting impurity ions into the exposed portion of the semiconductor substrate to form an impurity ion-implanted layer; forming a spacer at the sidewall of the patterned nitride film, and at the same time, etching the ion-implanted layer using the spacer as a mask; etching a portion of the semiconductor substrate exposed by the etching of the ion-implanted layer, using the spacer as a mask, thereby forming a trench; removing the spacer; annealing the trench so that the corner of the trench is rounded; forming a second oxide film along the inner wall of the trench; depositing a polarizing oxide film on the entire surface of the resulting substrate in such a manner as to gap fill the trench; subjecting the polarizing oxide film to chemical mechanical polishing (CMP) using the nitride film as a polishing stopper film, thereby polarizing the polarizing oxide film; and removing the nitride and first nitride films remaining after the polarizing step.